

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 26 SEP 2005

MRO PCT

C042

Applicant's or agent's file reference P24328PC	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/NO2004/000227	International filing date (day/month/year) 22.07.2004	Priority date (day/month/year) 24.07.2003
International Patent Classification (IPC) or national classification and IPC C02F 1/20, B01D 19/00, B63B 11/04		
Applicant KNUTSEN OAS SHIPPING AS et al		

- This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 5 sheets, including this cover sheet.
- This report is also accompanied by ANNEXES, comprising:
 - ☒ (sent to the applicant and to the International Bureau) a total of 2 sheets, as follows:
 - ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application |

Date of submission of the demand 29.03.2005	Date of completion of this report 09.09.2005
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/NO2004/000227

Box No. I Basis of the report

1. With regard to the language, this report is based on:

- ☒ the international application in the language in which it was filed
- ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rules 12.3(a) and 23.1(b))
- ☐ publication of the international application (Rule 12.4(a))
- ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1 - 7 as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☒ the claims:
- pages _____ as originally filed/furnished
- pages* _____ as amended (together with any statement) under Article 19
- pages* 1 - 2 received by this Authority on 04.08.2005
- pages* _____ received by this Authority on _____
- ☒ the drawings:
- pages 1 - 3 as originally filed/furnished
- pages* _____ received by this Authority on _____
- pages* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1 - 4</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1 - 4</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1 - 4</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Reference is made to the following documents:

- D1) GB-2 171 613-A
- D2) GB-1 531 537-A
- D3) US-6 171 508-B1
- D4) DD-224 223-A1
- D5) WO-02062707-A1

The present invention relates to a device for reducing the oxygen content of seawater for treatment of ballast water in a ballast tank (4) of a ship(1). One aim of the invention is to neutralise organisms in the ballast water. Another aim is that the treatment of the ballast water must be inexpensive in use.

Amongst the documents cited in the search report, document D1 comes closest to the invention according to amended claims of August 4, 2005.

D1 (p.1, line 51-p.2, line 78 and figs.1-4) discloses a method and an apparatus for treating water. Water to be deaerated in a deaeration unit (2) is fed from a pipeline or an open inlet channel (1) through a siphon (2) and an open feed channel (3) to a granular media filter (4). The deaeration unit comprises a riser (5), a cascade (6) and a downcomer (7). Air and/or gas, which are removed in the cascade, is satisfactorily re-entrained and carried down in the downcomer (7) provided that the flow velocity in the downcomer exceeds 0.3 metres/sec. The re-entrained air and/or gas rises to the surface in the feed channel (3) and escapes.

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: BOX V

The device in claim 1 differs from what is revealed in D1 in that the downcomer (12) has an upper part that is situated well above the deck of a ship (1), which includes a ballast compartment (4). This feature can be clearly seen on figs.1 and 2. Furthermore, the subject matter of claim 1 differs in that the upper part of the downcomer is directly connected to a pipe (10) for supplying water, and also in that the downcomer's lower part is communicating with the ship's ballast compartment. Hence, the invention is novel.

The problems in connection with treatment plants for ballast water (cf. also the description p.5, line 20-p.7, line 13, fig.1-3 and first paragraph on this Box) to be solved by the present invention are not disclosed in D1. This document does not give any indication that would lead a person skilled in the art to the claimed device. Therefore, the claimed invention is not obvious to a person skilled in the art. Consequently, the invention according to claims 1-4 is considered to involve an inventive step.

The invention in claims 1-4 is considered to be industrially applicable.

Concerning observations in claim 1, see Box VIII.

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

There is a misspelling on line 14 in claim 1. The expression "lover party" is considered to be spelled: lower part.

A m e n d e d C l a i m s

1. A device for reducing the oxygen content of ballast water on a ship (1) where ballast water is introduced into the upper part (14) of a downcomer (12), whereby a pressure drop arises, especially in the upper part (14) of the downcomer (12), facilitating the release of gases from the seawater, the separated gas being able to leave the seawater after flowing through the downcomer (12) together with the seawater,
c h a r a c t e r i z e d i n that the upper part (14) of the downcomer (12), that is situated well above the ship's (1) deck, is directly connected to a water supply pipe (10), and where the downcomer's (12) lower part is communicating with the ship's (1) ballast compartment (4).
2. A device according to Claim 1,
c h a r a c t e r i z e d i n that the upper part (14) of the downcomer (12) communicates with a gas pipe (15), where the gas pipe (15) is arranged to deliver nitrogenous gas to the downcomer (12).
3. A device according to Claim 1,
c h a r a c t e r i z e d i n that the lower part of the downcomer (12) is coupled, preferably in the horizontal direction, to the upper part (18) of a vertical separating pipe (16), wherein the upper part (18) is coupled to an extraction pipe (20) at a slightly higher level than that of the point of connection of the downcomer (12) to the separating pipe (16).
4. A device according to Claim 3,
c h a r a c t e r i z e d i n that the connection

between the downcomer (12) and the separating pipe (16)
is tangential.

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